G. H. CORLISS.

PUMP VALVE.

No. 190,469. Patented May 8, 1877.

Fig: 1.

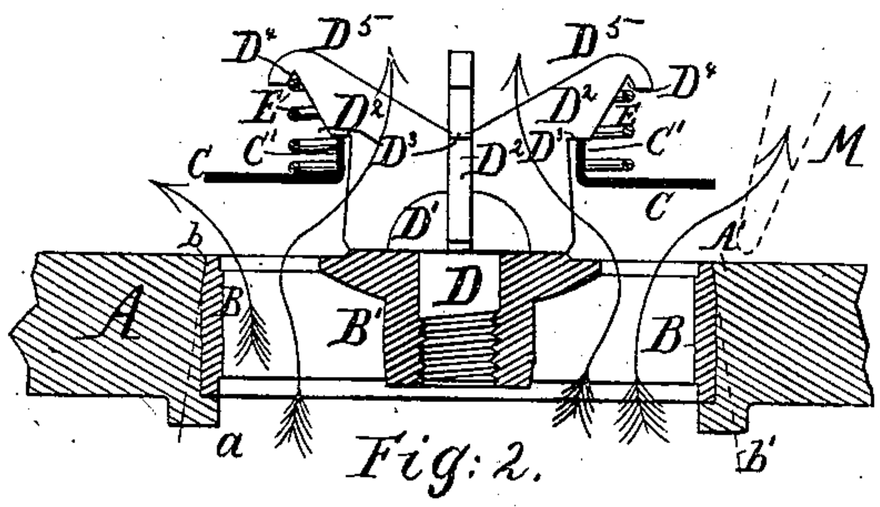


Fig: 2.

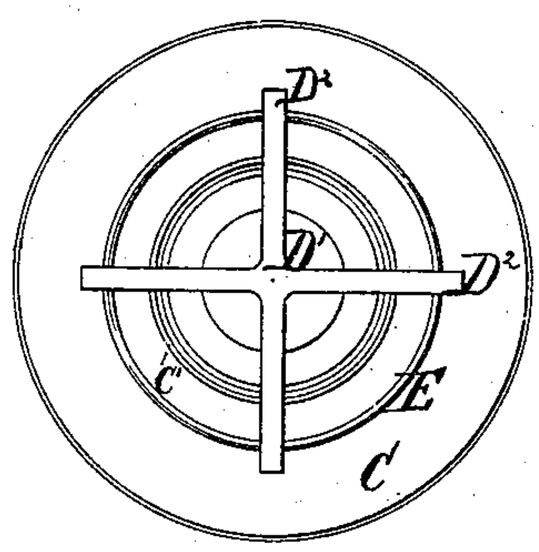


Fig: 3

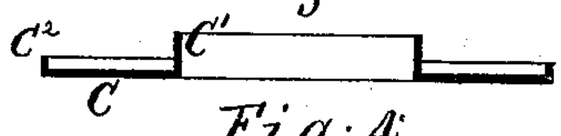
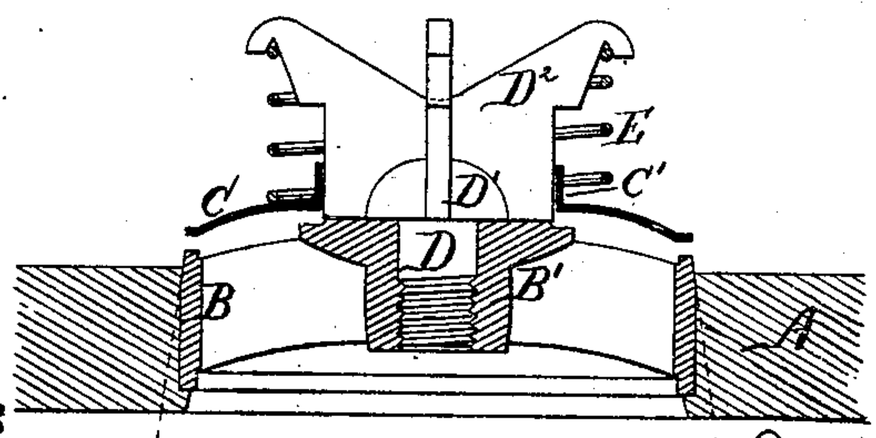


Fig: 4.



Witnesses:

A. Henry Gentner

Chas. C. Stetson.

Inventor:

George H. Corliss.

by his attorney

J. D. Stetson.

New York.

UNITED STATES PATENT OFFICE.

GEORGE H. CORLISS, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN PUMP-VALVES.

Specification forming part of Letters Patent No. **190,469**, dated May 8, 1877; application filed October 13, 1876.

To all whom it may concern:

Be it known that I, GEORGE H. CORLISS, of Providence, Rhode Island, have invented centain new and useful Improvements relating to Valves for Pumps and analogous uses, of which the following is a specification:

I propose to manufacture valves and seats therefor so that the parts may be interchangeable at will.

The accompanying drawings represent what I consider the best means of carrying out the invention.

Figure 1 is a central section through the valve-seat, with the immediately adjacent portion of the pump in which the seat is secured, and an elevation of the peculiar guide and stop, which also form an abutment for a spring which gently presses the valve to its seat. Fig. 2 is a top view.

The remaining figures represent modifications.

Fig. 3 is a section of the valve detached. Fig. 4 is a section showing several of the parts modified.

Similar letters of reference indicate corresponding parts in all the figures.

Fig. 1 shows the valve quite up against the stop which arrests its further ascent. Fig. 4 shows the valve lifted to a much smaller extent.

Referring to Figs. 1 and 2, A is a fixed portion of the pump in which my valves are to be worked Holes are cored or otherwise produced corresponding in number to the number of valves required, and each hole is counterbored nearly but not quite through, leaving a shoulder, *a*, to form a firm support for the lower edge of the valve-seat B. The valve is of annular form, and is unusually light. Its slight inertia allows it to rise and sink very rapidly. C. is the principal portion, and C′ is a deep flange spun up or otherwise produced on the inner edge. From the rim or outer seat B radial arms extend inward to a hub, B′. The valve C, on sinking to its seat, forms a tight contact both with the parts B and B′. D is a screw tapped into the hub B′ from above. It has a peculiarly-winged head, which performs several important functions. The parts are denoted D^1, D^2, &c. I have represented four wings; but the number may be more or less. It is essential only that there be liberal spaces between the wings through which the water may rise, which flows inward as the valve rises. A hub or stout central portion of the head is marked D^1. Vertical or nearly vertical guiding-surfaces, which form the outer boundary of the lower part of the wings, are marked D^2. A horizontal offset of sufficient width, forming a stop for the valve, is marked D^3. A recess under the overhanging top of each wing is marked D^4. A coil-spring, E, is held in the recess D^4, and is held down thereby. It presses on the upper face of the valve C. The wings form an abutment for this spring, which presses with sufficient force on the light valve, to force it rapidly to its seat the moment the upward flow of water is stopped.

To apply the parts together, the bolt D, with its winged head, is inverted, and first the spring E, next the valve C, and then the seat B B′ are successively placed in position thereon, and the seat is screwed solidly down. The whole may now be packed or carefully stowed away until required.

When in position the valve C rises and sinks, guided by the surfaces D^2, stopped by the stops D^3, and urged down with a nearly uniform but gentle force by the spring E. When up it allows the fluid to flow inward past its inner edge, as well as outward past its outer edge. When down on its seat it fits tightly on the part B and on the part B′.

The inertia of the ordinary valve induces considerable difficulty in rapidly-working pumps. The pressure of the water on the limited area below is unable to overcome the inertia and lift the heavy valve from its seat until the pressure becomes excessive. Then the inertia of the valve, when rapidly thrown up, causes it either to hammer with violence against a stop, or to be thrown higher than is necessary, and under some conditions the water will commence to flow backward through the valve in considerable quantity before it has time to overcome the inertia of the heavy valve, and bring it down to its seat.

My invention allows the valve C to be very thin and light. I propose, if desired, to also turn up a flange, C^2, at the outer edge, to aid in stiffening the valve when formed of very thin material. This modification is shown in

Fig. 3. I can make the ribs or arms in the seat, which connect the rim B with the hub B′, of such height as to touch the under face of the valve, and aid in supporting it; but I prefer not to do so, and to employ the form shown, as thus I am able to make a good finish with ordinary tools around the outer and inner edges where the water has to pass, and also allow the water to act against a larger area of the under surface of the valve to lift it.

Fig. 4 shows a modification, in which the hub B′ of the seat is held higher than the rim B, and the valve C is made correspondingly dishing. This may enable the thin metal to withstand a greater pressure of the water; but I prefer under most circumstances the form shown in Figs. 1 and 2.

The valves may be used in pumps of all kinds for pumping water, air, or any other fluid.

It is far preferable to guide the valve and leave the space for the central water-way by means of ribs D^2 on the fixed central part, instead of, as has been heretofore practiced, forming wings extending inward from a valve to a small central guide.

Among other advantages the difference of inertia may be mentioned as very important in quick-working valves. The arms reaching inward from an annular valve are a part of the valve, and their inertia requires to be overcome with each movement. My invention, on the contrary, makes the guiding-wings a part of the stationary work. The valve in my construction has only the inertia due to the light annular part itself.

I will designate by D^5 the overhanging arms above the offsets D^3, which carry the hooks or recesses D^4. They allow the use of plain helical springs. The strain on the metal of this form of spring is more uniform than any other, and the durability of the spring is unsurpassed, when, as in this case, the offsets D^3 prevent the spring from being overcompressed.

I claim as my invention—

1. The thin and light concentric valve C, in combination with the seat-rim B; seat hub B′, and ribbed guide D D^2, as herein specified.

2. The overhanging arms D^5, provided with hooks or notches D^4, in combination with the ribbed guide D^2, with its stops D^3, and with the valve C C′ and helical spring E, as herein specified.

In testimony whereof I have hereunto set my hand this 28th day of September, 1876, in the presence of two subscribing witnesses.

GEO. H. CORLISS. [L. S.]

Witnesses:

GEO. A. DODGE,

GEO. W. KENNEDY.